

Remarks

Applicants thank the Examiner for examining the present application, for finding that Claim 52 contains allowable subject matter. With entry of this amendment, Claims 1, 2, 4-6, 8, 24-27, 29-35, 37-39, 41-53, and 152 remain.

In the interest of expediently moving the application toward allowance, Claim 1 has been amended to clarify that the feedstock does not comprise aromatic binders and/or metal powders that interact to form impurities that would degrade the properties of articles resulting from application of the powder metallurgy forming techniques to the feedstock. No new matter has been introduced. Applicant believes that the application is in condition for allowance and respectfully requests timely issuance of a notice of allowance.

Applicants hereby add new Claim 152, which is an amended version of original Claim 52, in which the Examiner has found allowable subject matter, rewritten in independent form. Independent Claim 152 contains all the limitations of Claim 52, the base claim from which it depends, and any intervening claims. No new matter is introduced.

JP 7901021 does not teach each and every element of independent Claim 1

The examiner rejects independent Claim 1 and dependent Claims 2, 4, and 5 as being anticipated under 35 U.S.C. §102(b) by JP 7901021. The examiner's rejection is traversed as being improper. A proper anticipation rejection requires that a reference

“teach every element of the claim (MPEP 2131).” As discussed below, JP 7901021 fails to teach all the features of Claim 1 and the rejection should be withdrawn.

Claim 1 recites, in part, a feedstock composition comprising a metal powder and an aromatic binder, wherein the feedstock comprises “less than approximately 40 vol% of the aromatic binder and no additional binders in an amount totaling greater than 10 vol%.” The examiner asserts that JP 7901021 discloses “a composition comprising a mixture of tantalum powder (getter metal), camphor, benzene as well as 0.5 wt% naphthalene (Office action, pg. 2).”

JP 7901021 does not teach the amount of aromatic binder in the mixture. Both benzene and naphthalene are aromatic compounds, but JP 7901021 does not teach the amount of benzene. As described by the Applicants’ specification, the number and amount of components, including the aromatic binder, in the feedstock should be controlled in order to minimize the impurities in the final sintered part. Accordingly, the Applicants’ Claim 1 specifies that the aromatic binder should compose less than approximately 40 vol% of the feedstock. JP 7901021 does not anticipate the Applicants’ claimed invention and does not teach the total amount of aromatic compounds in the mixture.

Furthermore, JP 7901021 teaches the addition of 2 – 7 wt% camphor (based on the Ta), which is dissolved in benzene, to the metal powder. Camphor is not an aromatic and is added in a quantity that is outside of the claimed invention. Applicants have converted the 2 – 7 wt% camphor into the equivalent volume percent, which is approximately 26 vol% to approximately 56 vol%. The amount of added camphor taught

by JP 7901021 is well outside of the range described by Applicants' Claim 1, which recites, "no additional binders in an amount totaling greater than 10 vol%."

For at least these reasons, JP 7901021 does not implicitly or expressly teach each and every element of independent Claim 1 as required by 35 U.S.C. §102(b). The examiner has failed to establish a prima facie case of anticipation. Accordingly, the examiner's rejection of Claim 1 should be withdrawn and such action is respectfully requested.

The examiner's rejections of the claims that depend from independent Claim 1 should also be withdrawn for at least the reasons discussed above with respect to the independent claim as well as for their own respective features, which are neither shown nor suggested by the cited art.

Broodo does not teach each and every element of independent Claim 1, as currently amended

The examiner rejects independent Claim 1 and dependent Claims 2, 4, 24, 25, and 26 as being anticipated under 35 U.S.C. §102(b) by U.S. Patent No. 3,302,073 ("Broodo"). Applicants have amended independent Claim 1 to further clarify that the feedstock does not comprise constituents that interact to form impurities that would degrade the properties of articles resulting from application of the powder metallurgy forming techniques to the feedstock. The instant invention is directed to reactive metals, which are difficult to form in complex shapes and which are prone to degradation of mechanical properties (e.g., hardness, toughness, elasticity, brittleness, etc.) when articles of said reactive metals are contaminated with impurities associated with the feedstock

and/or processing (See Specification, at least paragraphs [0002] – [0004], [0007], [0014], and [0016]).

The composition described by Broodo comprises an organic binder such as chlorinated naphthalene in an amount of up to 15 wt%. Chlorine, and other halogens, is well known by those having skill in the art to be a property-degrading impurity when it contaminates articles of reactive metals. For example, in the production of Ti, great care is taken to remove Cl without introducing other impurities (e.g., carbon, silicon, iron, oxygen, nitrogen, etc.) in levels that would degrade the mechanical properties of the Ti. Therefore, the introduction of chlorine in a feedstock for powder metallurgy forming techniques, through the use of chlorinated naphthalene or other halogenated compounds, is extremely undesirable and is contrary to the Applicants' claimed invention.

Accordingly, in an effort to expedite issuance of a notice of allowance, Applicants have amended independent Claim 1 to recite the additional limitation that the aromatic binder and the metal powder “do not chemically interact with one another to form property-degrading impurities in articles resulting from application of the powder metallurgy forming techniques to the feedstock.” The substantial lack of chemical interaction between the aromatic compound and the metal powder is not disclosed or suggested by Broodo, and currently-amended Claim 1 is allowable for at least this reason.

The claims that depend from independent Claim 1 are in condition for allowance for at least the reasons discussed above with respect to the independent claim as well as for their own respective features, which are neither shown nor suggested by the cited art.

The combination of Morita and Broodo does not teach all the elements of Claim 1

The examiner rejects independent Claim 1 and dependent Claims 2, 4, and 5 under 35 U.S.C. §103(a) as being obvious over U.S. patent application 2002/0057980 (Morita) in view of U.S. Patent No. 3,302,073 (Broodo). The examiner has failed to establish a prima facie case of obviousness and the rejection is traversed as being improper.

Applicants' Claim 1 recites, in part, a feedstock comprising an aromatic binder and a metal powder, "wherein said *aromatic binder* and said *metal powder* are mixed to form a feedstock...(emphasis added)" In contrast, Morita teaches mixing a metal powder with an *organic binder being dissolved in an organic solvent* (Morita, pg. 13, col. 1, lines 1-2). Morita does not teach a feedstock wherein the aromatic binder and the metal powder are mixed.

Furthermore, Morita teaches away from the Applicants' claimed invention. Applicants' claimed invention is directed toward a feedstock for powder metallurgy forming techniques used to form dense articles of reactive metals (See, for example, Specification, pg. 10, paragraph [0028]). In contrast, Morita teaches a mixture that is compacted to "obtain a porous material (Morita, pg. 13, col. 1, line 4)." Morita does not teach or suggest a composition for forming dense parts from reactive metals.

Further still, as explained elsewhere herein, Broodo does not teach all the limitations of the currently amended Claim 1, which recites, in part, an aromatic binder and a metal powder that "do not chemically interact with one another to form property-degrading impurities in articles resulting from application of the powder metallurgy forming techniques to the feedstock."

For at least the reasons described herein, the combination of Morita and Broodo do not teach all the limitations of independent Claim 1. Accordingly, the Examiner's §103(a) rejection should be withdrawn and such action is respectfully requested (See MPEP 2143.04: "to establish prima facie obviousness of a claimed invention, all the claimed limitations must be taught or suggested by the prior art.")

The examiner's rejections of the claims that depend from independent Claim 1 should also be withdrawn for at least the reasons discussed above with respect to the independent claim as well as for their own respective features, which are neither shown nor suggested by the cited art.

Examiner's obviousness rejection based on the combination of JP04116104, JP06002011, and Hermann is improper

At the outset, Applicants note that with respect to JP04116104, the Examiner has apparently relied upon both the English language abstract of the foreign language patent as well as the underlying document to support a rejection, but has failed to supply a translation of the underlying document. According to MPEP 706.02, while it is acceptable to use the translated abstract to support a rejection, the evidence relied upon is the facts contained in the abstract, not additional facts that may be contained in the underlying full text document. In order to rely on the underlying document to support a rejection, as it appears the examiner has done (see Office action, middle of pg. 4), "a translation must be obtained so that the record is clear as to the precise facts the examiner is relying upon in support of the rejection (MPEP 706.02)." In not providing a translation

of the full document, the Applicants believe that the Examiner has failed to make the record clear as to the precise facts the examiner is relying upon in support of the rejections. For at least this reason, the Office action is not believed to be a proper action on the merits and the subsequent action should not be made final (see MPEP 706.07). However, in the interest of expediently obtaining a notice of allowance, Applicants have, nonetheless, attempted to address the Examiner's concerns as best as possible.

The Examiner has rejected Claims 1, 2, 4-6, 24-27, 29-35, 41-51, and 53 under 35 USC §103(a) as being unpatentable over JP04116104 in view of JP06-002011 and Hermann. The Examiner has failed to establish a prima facie case of obviousness for at least the following reasons, and the Examiner's rejections are traversed.

As suggested elsewhere herein, JP04116104 teaches away from the Applicants' claimed invention because rather than an aromatic binder, it includes a "binder" and a separate "sublimable substance," wherein the binder serves to maintain the form of the molded body and the sublimable substance serves to create pores in the molded body through which the binder can escape during dewaxing and sintering. It, therefore, relies on a binder that is NOT a sublimable substance to maintain the integrity of the molded body.

The Examiner has asserted that the sublimable substance "inherently acts as a binder" in the JP04116104 composition (Office action, pg. 4). As described elsewhere herein, Applicants respectfully disagree. JP04116104 clearly states that a "molded body is formed with metal powder, a binder, and 3-15 wt% sublimable substance" (e.g., camphor, naphthalene, or dichloro-benzene). In other words, JP04116104 teaches that the binder and the sublimable substance are distinct constituents. Furthermore, the

disclosure of JP04116104 actually teaches away from the use of an aromatic species as the binder, as claimed by the applicants. The sublimable substance described by JP04116104 is a pore forming agent. It is NOT an aromatic binder.

The composition disclosed in JP04116104, describes “dewaxing” of the molded body, indicating that the JP104116104 composition uses waxes, not the sublimable substance, as a binder. Waxes can be difficult to remove from reactive metal articles and Applicants specifically describe the negative effects of using waxes as binders in the specification at page 5, paragraph [0016]. Furthermore, it is clear that the sublimable substance described in JP04116104 is not a binder because it is removed by vacuum treatment *prior to* dewaxing and sintering. That the feedstock comprises an aromatic binder is significant in the present invention because Applicants have found that it results in finished articles having minimal impurities, minimal oxidation, and little or no carbon and/or nitrogen residue since the aromatic binder can be easily removed and does not require burn-out in oxidizing environments.

JP04116104 also teaches away from the Applicants’ claimed invention in that the purpose described by JP04116104 is the formation of a porous body. In contrast, as described elsewhere, the Applicants claimed invention is directed toward powder metallurgy feedstocks for *dense* parts of reactive metals (See Specification, pg. 10, paragraph [0028]). JP04116104 indicates that the purpose of the sublimable substance is to form pores in the molded body, not to bind the metal powder together. The sublimable substance contributes to pore formation, which pores serve a specific purpose. JP04116104 describes this purpose, stating that “the resulting porous molded body is dewaxed and sintered...the binder can flow out through the pores and the molded body is

not damaged by cracking or swelling. Accordingly, the sublimable substance serves to create pores in the molded body. Another constituent (e.g., waxes) serves as the binder. Once the sublimable substance is removed, pores are formed through which the binder can escape during dewaxing and sintering. JP04116104 teaches the use of the sublimable substance to form pores in the molded body and teaches away from an aromatic binder as claimed by the Applicants.

For at least these reasons, JP04116104 in combination with JP06-002011 and Hermann fails to teach all the limitations of, and/or teaches away from, the Applicants' claimed invention. Therefore, JP04116104 is not properly combinable with ordinary skill in the art or with the other references as a basis for a prima facie 103(a) rejection of the Applicants' claims. Accordingly, the Examiner has failed to establish a prima facie case of obviousness and the rejection should be withdrawn (See *In re Fine*, 873 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)).

The examiner's rejections of the claims that depend from independent Claims 1 and 41 should also be withdrawn for at least the reasons discussed above with respect to the independent claims as well as for their own respective features, which are neither shown nor suggested by the cited art.

Conclusion

For the reasons recited above, the application is believed to be in condition for allowance. Therefore, Applicants respectfully request that a timely Notice of Allowance be issued in this case. No additional claim fees are believed to be due. However, should such fees exist, or if any additional fees may be required in connection with filing this amendment and any extension of time, the Director is hereby authorized to charge our Deposit Account No. 02-1275.

Respectfully submitted,



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